IMd

Contact Albert Repko, Pim Peters
Address Jan Leentvaarlaan 62
3065 DC Rotterdam, Netherlands

Phone +31 10-2012381
Email imd@imdbv.nl
Website www.imdbv.nl

Organisation

IMd Raadgevende Ingenieurs is an organisation with a great core of highly qualified employees, who have been applying their experience, know-how and expertise for many years with regard to advising about, designing and working out main structures for buildings. At present the firm consists of 40 highly educated employees. IMd is completely independent and does not have any business links with manufacturers, suppliers, contractors, developers and other interested parties who could influence our impartial and independent consultancy.

IMd is a member of the Dutch association of consulting engineers (ONRI) and possesses the "quality management system" certificate according to NEN-AND-ISO 9001.
It is a firm where the internal communication proceeds smoothly and all employees are kept informed about the most recent developments.

In the almost 50 years that our firm has existed the quality of our service has always been a key issue. The most important characteristics of this service for us are:

- A good product that fits the budget of the client
- Aproduct that fits the concept of the architect
- Creativity and ingenuity
- A flexible and service-oriented attitude

Projects

They vary greatly: from prestigious office complexes to pedestrian bridges, from houses to complex shopping centres, from alterations to new-housing and from simple and small to complex and large. Each project has its own charm and is a constructive challenge. The projects are carried out at the request of property developers, government organisations, foundations, architects, contractors and private parties. This diversity in clients is made possible because of the independence of the firm of consulting engineers.

View IMd Raadgevende Ingenieurs

The view of IMd is that the success of a project largely depends on the first stage of the design process. The cooperation between architect, client, mechanical engineer and structural engineer is decisive in order to have a fine design in complex projects. In the preliminary design various alternatives are presented for the structure of a building. The advantages and disadvantages of every constructive alternative will then be discussed in the design team. Wishes of the client and architect, requirements in the field of building physics, possibilities regarding the technical installations: they all affect the choice of an optimal structural design.
In addition to the constructive design, IMd regards its role as a coordinating engineer as very important. In its existence IMd has built up a perfect reputation. In addition to the inspection of the basic principles of the drawings and calculations of suppliers of prefabricated concrete and steel constructions, the content of these elements is also assessed with great care. We ask the client to make it possible for us to carry out the consultancy work in a constructive way. In the end this will create the best result for the client.

Short Description

Office tower 'Blaaktoren', Rotterdam

This project regards a 20-storeyed office tower, including a split-level 8-storeyed car park in Rotterdam. The most eye-catching feature of the design of the 'Rotterdam Blaaktoren' is the cantilevered façade that protrudes from the 6th floor upwards. The façade's tree structure is also a remarkable element. The building's main supporting structure is partly executed as diagonals and columns, which are placed in the façade and give the building the impression of being 'supported' by trees. The prefab front construction is connected to 5 steel girders, located astern, which stretch over three storeys. This spectacular construction was designed with the use of 2D and 3D ESA-Prima Win computational models.

Project Information

Owner: Blauwhoed Vastgoed, Rotterdam
Architect: DREISSEN architectuur, Rotterdam & GROUPA, Rotterdam
General Contractor: Dura Vermeer, Rotterdam
Engineering Office: IMd Raadgevende Ingenieurs

Construction Start: 01/02/2009
Construction End: 01/01/2011
Location: Blaak, Rotterdam, Netherlands

Introduction

Architectural firms Dreissen and Group A have created the design for a 20-storeyed office tower, including a split-level 8-storeyed car park in Rotterdam. A striking feature of the building is the cantilever, which protrudes from the building at 21 metres above street level, i.e. the Verlengde Willemsbrug. The façade's tree structure, too, is a remarkable element. The building's main supporting structure is partly executed as diagonals and columns, which are placed in the façade and give the building the impression of being 'supported' by trees. 2D- and 3D-ESA-Prima Win computational models were used for the design of the prefab façades. A distinctive element is the modelling of the cantilevered prefab façade, with the steel lattice framework located behind the front, which transfers the horizontal and vertical pressure load to the rear floors.

Design

Remarkable are the interlocking prefab façade elements. These, together with the draw benches – located in the floors behind the façade – form the supporting wall girders. The prefab fronts are also partly responsible for the building's stability: together, the outward façades form a solid, tube-shaped construction, which processes the largest part of the horizontal load, consisting of wind pressure and the cantilever force.

In order to determine a precise estimate of the local internal pressure existent in the prefab façades, 2D and 3D computational models of the walls were created. The 5 steel lattice framework girders behind the protruding front were also included in the computational models. The horizontal draw benches in the floors were implemented through numeric bars, which exclusively model the horizontal rigidity of the floors. The bars were outfitted with an extremely low flexural rigidity, in order to prevent them from processing a bending force. All prefab façade

Used software: ESA-Prima Win

elements, including the vertical joints between them, were processed through the computational model. The interlocking façades, too, were included in the model. The different prefab façades interlock at the cantilever. First, this effect was determined through vertical springs, with the use of 2D computational models. The relative rigidity of the springs was determined by unit loads. After that, a complete 3D model was made, and closer attention was paid to the exact force-displacement between the walls. Possible flange movement in the stabilising prefab walls was taken into account during the calculations.

Development and execution

While determining the concept of the building’s main supporting structure, close attention was paid to the optimum engineering feasibility of the project as a whole. The concept was designed in such a way, that no temporary supporting systems are necessary during the construction works below the 21 metre-measuring cantilever.

By opting for a prefab façade design, the tower construction can take place at a high pace. In situ constructed façade elements would take up much more time, partly because of the different shapes and positions of the window openings at each floor.